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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,043	06/26/2003	Edward L. Sughure II	34035US	6408

7590 10/30/2006

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EXAMINER

DOUGLAS, JOHN CHRISTOPHER

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/607,043	Applicant(s) SUGHURE ET AL.	
	Examiner John C. Douglas	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-81 is/are pending in the application.
- 4a) Of the above claim(s) 7, 18, 22, 23, 32 and 50-65 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-17, 19-21, 24-31, 33-49 and 66-81 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Examiner acknowledges the response filed on 8/07/2006 containing amendments to the claims and remarks.
2. Examiner acknowledges claims 50-65 as withdrawn, claims 7, 18, 22, 23, and 32 as cancelled, and claims 66-81 as added.
3. A new rejection necessitated by amendment follows:

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-6, 8-12, 14-17, 19-21, 24-31, 33-49, 66-71, 74-76, and 78-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russ et al. (US 5,366,614) in view of Sughrue et al. (US 6,254,766 B1).

8. The Russ reference discloses a process for desulfurizing a hydrocarbon such as cracked gasoline. The process comprises contacting a hydrocarbon feedstock in a reforming zone with a particulate system comprising a physical mixture of a reforming catalyst and a sulfur sorbent. The mass ratio of catalyst to sorbent can range from 1:10 to 10:1. This combination of catalyst and sorbent would necessarily desulfurize the hydrocarbon while improving the octane of the hydrocarbon. Since reforming includes isomerization and cracking reactions, the catalyst would necessarily be effective, to some extent, for isomerization and cracking. The reforming catalyst comprises a platinum group metal and a support such as a zeolite. Specific zeolites include those identified as FAU and MFI. The zeolite type identified as MFI includes ZSM-5 zeolites. These zeolites may be in the hydrogen form and necessarily comprise rings of T atoms and have channel dimensionality as claimed. Operating conditions include temperatures from 260° to 560°C (500° to 1040°F). The catalyst/sorbent mixture can be regenerated

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and reactivated while other reactors remain on-stream. This discloses simultaneous desulfurization and regeneration and this regeneration would necessarily remove sulfur and coke from the particles. Russ also discloses where the catalyst mixture removes H₂S from the feed. See column 1, lines 39-55; column 3, lines 27-34 and 52-68; column 5, lines 1, 2, and 66-68; column 6, lines 1-68; column 7, lines 1-15 and 43-64; column 8, lines 17-23; column 9, lines 25-68; column 10, lines 1, 2, and 61-68; and column 11, lines 1-10.

The Russ reference does not disclose the oxidation and reducing steps to regenerate and reactivate the particulate system, does not disclose a zinc oxide and promoter metal sorbent, does not disclose the amount of or silica-alumina ratio of the zeolite in the catalyst, does not disclose the mean particle size range, does not disclose that the particles have a Group A Geldart characterization, and does not disclose the claimed sulfur concentration of the feed prior to desulfurization.

The Sughrue reference discloses a desulfurization sorbent that comprises zinc oxide (10-90 wt%), alumina, silica, and nickel (5-50 wt%). Since alumina is present in the sorbent, an aluminate would necessarily be present. A substitutional solid solution as claimed would also be formed. The sorbent is regenerated by oxidation followed by reduction as claimed. The oxidation is performed at temperatures ranging from 800° to 1200°F and the reduction is performed at temperatures ranging from 100° to 1500°F. The sorbent has particle sizes in the range of 20 to 500 microns. Sughrue discloses where the feed has about 1400 to about 10,000 ppm of sulfur and where the desulfurization process reduces the sulfur to less than 100 ppm. See column 2, lines

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59-65; column 4, lines 8 through column 6, line 26; and column 8, line 30 through column 9, line 36.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Russ by utilizing the sorbent of Sughrue in place of the sorbent disclosed by Russ because the sorbent is effective at desulfurizing the feed streams of Russ with minimal effect on the octane of the feed stream. One would necessarily use the regeneration and reactivation procedure that is effective for the sorbent of Sughrue.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Russ by utilizing any amount of zeolite and utilizing a zeolite having the claimed silica:alumina ratio because one would adjust the amounts in order to maximize the production of the desired product and because any zeolite that falls within the classes of zeolites disclosed would be expected to be effective in the process regardless of the silica:alumina ratio of the zeolite.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Russ by utilizing particles with the claimed size and Group A Geldart characterization because as long as there is effective contact, one would utilize any type of particles in relation to size and Group A Geldart characterization.

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Russ et al. (US 5,366,614) in view of Sughrue et al. (US 6,254,766 B1) as applied to claim 7 above, and further in view of Dodwell (US 6,429,170).

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The previously discussed references do not disclose the use of perlite in the sorbent.

The Dodwell reference discloses a sorbent that comprises zinc oxide, silica, alumina, and a promoter metal. The silica is in the form of perlite. See column 3, lines 6-24.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of the previously discussed references by including perlite in the sorbent of Sughrue as the silica source as suggested by Dodwell because the sorbent life and attrition value of the sorbent can then be controlled.

10. Claims 72, 73, and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Russ in view of Sughrue as applied to claims 1, 38, and 74 above, and further in view of Weinberg (US 5059302). Russ in view of Sughrue do not disclose where the average particle density of the catalyst is within about 50 percent of the average particle density of the sorbent.

However, Weinberg discloses catalyst particles with densities ranging from 1.28 to 2.08 g/cc and sorbent particles with densities in the range of 1.75 to 3.00 g/cc (see Weinberg, column 7, lines 57-60).

Weinberg discloses that the sorbent particles and catalyst particles must be sufficiently different in density such that they can be segregated from each other (see Weinberg, column 6, lines 31-35).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Russ in view of Sughrue to include catalyst particles with densities ranging from 1.28 to 2.08 g/cc and sorbent particles with densities in the range of 1.75 to 3.00 g/cc because the sorbent particles and catalyst particles must be sufficiently different in density such that they can be segregated from each other.

Response to Arguments

11. Applicant's arguments filed on 8/7/2006 have been fully considered but they are not persuasive.

12. Applicant first argues that Russ, by itself, does not teach the regeneration of sorbent and Sughrue, by itself, does not teach the regeneration of catalyst. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

13. Second, Applicant argues that Russ teaches separating the sorbent from the catalyst prior to regeneration is preferred and thereby teaches away from regenerating the sorbent together with the catalyst. However, preferred embodiments and disclose examples do not constitute a teaching away from a broader disclosure or nonpreferred embodiments (see *Merck & Co. v. Biocraft Labs.*, 874 F.2d 804, 807 (fed. Cir. 1989)).

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14. Third, Applicant argues that Russ teaches away from the use of zinc oxide sorbent. However, a statement that a first product is somewhat inferior to another product for the same use does not teach away when the reference also discloses that the first offers acceptable advantages (see *In re Gurley*, 27 F.3d 551, 553 (fed. Cir. 1994)). Russ, states that zinc oxide is a commercially available desulfurization catalyst (see Russ, column 18, lines 8-10).

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCD

10/18/2006



JOHN C. DOUGLAS
Examiner
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